

# Mechanical responses of axonal cytoskeleton

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The mechanical properties of the axonal cytoskeleton play an important role in development (growth and retraction) [1],[2],[3]. We are studying the mechanical responses of neurons using a home-built Force Apparatus which is an optical fiber based instrument [4]. Mechanical response of neuronal cells subjected to tension using the force apparatus shows a non-linear viscoelastic behavior. We are also studying stress relaxation and creep behavior of the axon. Axons also show a transition from a viscoelastic elongation to active contraction and we aim to investigate the mechanism responsible for this effect [5]. In short we plan to study (a) the roles played by the different cytoskeletal components, including motor proteins and MAPs in regulating the mechanical properties of axons, and (b) in exploring the feedback mechanism that regulate tension induced growth of axons. Our results show that f-actin plays important role in maintaining axonal tension which could be due to spectrin-actin skeleton arranged in periodic fashion [6].

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